

CLAIMS

1. A method of synchronising the delivery to a user of first information which is to
5 be presented to the user via first output means of a multi-modal interface and of
second information which is to be presented to the user via second output means of the
multi-modal interface, the method comprising the steps of:
 - i) estimating the total time needed to deliver the first information to the first
output means or to a store local to the first output means;
 - 10 ii) estimating the total time needed to deliver the second information to the second
output means or to a store local to the second output means; and
 - iii) using the estimates obtained in step i) or step ii) to determine whether the
presentation to the user of the first or second information to the user needs to be
delayed to achieve a desired synchronism of presentation; and
 - 15 iv) applying any delay determined in step iii) to achieved the desired synchronism of
presentation.
2. A method as claimed in claim 1, wherein the first and second output means are
provided by a single output device.
- 20 3. A method as claimed in claim 1 or claim 2, wherein either or both of the first
and second output means is/are visual display means.
4. A method as claimed in claim 1 or claim 2, wherein either or both of the first
25 and second output means is/are audio reproduction means.
5. A method as claimed in claim 1 or claim 2, wherein either or both of the first and
second output means is/are tactile reproduction means.
- 30 6. A method as claimed in claim 1, wherein the first means is visual display means
and the second means is audio reproduction means.

7. A method of synchronising the delivery to a user of first information which is to be presented to the user via a visual display of a multi-modal interface and of second information which is to be presented to the user over a visual or an audio interface of the multi-modal interface, the method comprising the steps of:

- 5 i) estimating the total time needed to deliver the first information to the visual display or to a store local to the visual display;
- ii) estimating the total time needed to deliver the second information to the visual or audio interface or to a store local to the visual or audio interface; and
- iii) using the estimates obtained in step i) or step ii) to determine whether the
10 presentation to the user of the first or second information to the user needs to be delayed to achieve a desired synchronism of presentation; and
- iv) applying any delay determined in step iii) to achieved the desired synchronism of presentation.

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8. A method of synchronising the delivery to a user of first information which is to be presented to the user via a visual display of a multi-modal interface and of second information which is to be presented to the user over an audio interface of the multi-modal interface, the method comprising the steps of:

- 20 i) estimating the total time needed to deliver the first information to the visual display or to a store local to the visual display;
- ii) estimating the total time needed to deliver the second information to the audio interface or to a store local to the audio interface; and
- iii) if the total time estimated in step i) is more than that estimated in step ii)
25 delaying the presentation of the second information to the user sufficiently to enable the first information to be presented to the user before the second information is presented to the user.

9. A method as claimed in claim 7 or claim 8, wherein the delivery of the first
30 information in step (i) is controlled by a server process, delivery of the first information involving delivery of that information to a client of the server process.

10. A method as claimed in any one of claims 7 to 9, wherein the delivery of the second information in step (ii) is controlled by a server process, delivery of the second information involving delivery of that information to a client of the server process.
- 5 11. A method as claimed in any one of claims 7 to 10, wherein the latency of the communication channel over which the first information will be delivered to visual display or the store is measured, the measurement of latency being used in the estimation of total time carried out in step (i).
- 10 12. A method as claimed in any one of claims 7 to 11, wherein the latency of the communications channel over which the second information will be delivered to the audio interface or to the store local to the audio interface is measured, the measurement of latency being used in the estimation of total time carried out in step (ii).
- 15 13. A method as claimed in claim 11 or claim 12, as dependent on claim 9 or claim 10, wherein the measurement of latency involves the server ~~and~~ sending a communication to the associated client to elicit a response therefrom, the measurement of latency being derived from the duration of the interval between the sending of the communication and the receipt of the response.
- 20 14. A method as claimed in any one of claims 7 to 13, wherein knowledge of the quantity of first information which is to be presented and knowledge of the bandwidth of the communication channel over which the first information will be delivered to the visual display or the store local to the visual display are used to calculate the time required to
- 25 transmit the first information to the visual display or the local store which is subsequently used in the estimation carried out in step i).
15. A method as claimed in any one of claims 7 to 14, wherein knowledge of the quantity of second information which is to be presented and knowledge of the bandwidth
- 30 of the communication channel over which the second information will be delivered to the visual display or audio interface or local store are used to calculate the time required to transmit the second information to the visual display or audio interface or local store which is subsequently used in the estimation carried out in step ii).

16. A method as claimed in any one of claims 7 to 15, wherein the estimate of total time produced in step i) includes a component for the time taken to render the first
5 information on the visual display.

17. A method as claimed in any one of claims 7 to 16, wherein the estimate of the total time needed to deliver the first content is based, at least in part, upon one or more characteristics of the communications channel over which the second information is
10 delivered, or wherein the estimate of the total time needed to deliver the second content is based, at least in part, upon one or more of the characteristics of the communications channel over which the first information is delivered.

18. A method as claimed in claim 17, wherein the latency of the communications
15 channel is a characteristic upon which the estimate is based.

19. A method as claimed in claim 16 or claim 17, wherein the bandwidth of the communications channel is a characteristic upon which the estimate is based.

20. A system of apparatus for the delivery to a user of first information which is to be presented to the user via a visual display of a multi-modal interface and of second information which is to be presented to the user over a visual or an audio interface of the multi-modal interface, the system including processing means configured to:
estimate the total time needed to deliver the first information to the visual display or to
25 a store local to the visual display;
estimate the total time needed to deliver the second information to the visual or audio interface or to a store local to the visual or audio interface; and
to use the estimates obtained to determine whether the presentation to the user of the first or second information to the user needs to be delayed to achieve a desired
30 synchronism of presentation; and to cause
any delay determined to be necessary to be applied to achieve the desired synchronism of presentation.

21. A system of apparatus for the delivery to a user of first information which is to be presented to the user via first output means of a multi-modal interface and of second information which is to be presented to the user via second output means of the multi-modal interface, the system including processing means configured to:

- 5 estimate the total time needed to deliver the first information to the first output means or to a store local to the first output means;
estimate the total time needed to deliver the second information to second output means or to a store local to the second output means; and
to use the estimates obtained to determine whether the presentation to the user of the
- 10 first or second information to the user needs to be delayed to achieve a desired synchronism of presentation; and to cause
any delay determined to be necessary to be applied to achieve the desired synchronism of presentation.